

AMENDMENTS TO THE CLAIMS (AS ON AMENDED SHEETS ANNEXED TO IPER)

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (original) Process for the biochemical synthesis of 6-amino caproic acid wherein either 6-aminohex-2-enoic acid of formula [1] (6-AHEA)



or wherein 6-amino-2-hydroxy-hexanoic acid (6-AHHA), a compound capable of being transformed into 6-aminohex-2-enoic acid, is treated with an enzyme having α,β -enoate reductase activity towards molecules containing an α,β -enoate group and a primary amino group, in particular with an enzyme having α,β -enoate reductase activity towards 6-aminohex-2-enoic acid.

2. (original) Process according to claim 1, characterized in that the enzyme having α,β -enoate reductase activity is an enzyme originating from a microorganism from the group of species of *Acetobacterium* sp., *Acremonium* sp., *Agrobacterium* sp., *Burkholderia* sp., *Cephalosporium* sp., *Clostridium* sp., *Escherichia* sp., *Moorella* sp., *Ochrobactrum* sp., *Pseudomonas* sp., *Salmonella* sp., *Shigella* sp., *Tilachlidium* sp., *Yersinia* sp., and *Vibrio* sp.
3. (currently amended) Process according to one of claims 1 or 2, characterized in that the enzyme having α,β -enoate reductase activity is an enzyme originating from *Acremonium* sp., *Clostridium* sp., *Moorella* sp. or *Ochrobactrum* sp.
4. (original) Process according to claim 3, characterized in that the enzyme having is an enzyme from *Acremonium strictum* CBS114157, *Clostridium tyrobutyricum* DSM1460, *Moorella thermoacetica* DSM1974, *Ochrobactrum anthropi* NCIMB41200, or *Clostridium kluyveri* DSM555.

5. (currently amended) Process according to claim 1 or 2, characterized in that the enzyme having α,β -enoate reductase activity has aerostable α,β -enoate reductase activity and is an enzyme originating from a microorganism from the group of species of *Agrobacterium* sp., *Burkholderia* sp., *Escherichia* sp., *Pseudomonas* sp., *Salmonella* sp., *Shigella* sp., *Yersinia* sp., and *Vibrio* sp.
6. (original) Process according to claim 5, characterized in that the enzyme having aerostable α,β -enoate reductase activity is an enzyme originating from an *Escherichia coli* species.
7. (original) Process according to claim 6, characterized in that the enzyme having aerostable α,β -enoate reductase activity is an enzyme originating from from *Escherichia coli* K12.
8. (currently amended) Process according to ~~any of claims 1-7~~ claim 1, characterized in that 6-aminohex-2-enoic acid is being converted into 6-amino caproic acid at a pH in the range of from 3 to 9.
9. (original) Process according to claim 8, characterized in that, the pH is in the range of from 4 to 8.
10. (original) Process according to claim 9, characterized in that the pH is in the range of from 5 to 8.
11. (original) Process according to claim 8, characterized in that, the pH is in the range of from 5.5 to 7 under anaerobic conditions and of from 6.5 to 8 under aerobic conditions.
12. (currently amended) Process according to ~~any of claims 1-11~~ claim 1, characterized in that the process is carried out in a host organism selected from the group of genera consisting of *Aspergillus*, *Bacillus*, *Corynebacterium*, *Escherichia* and *Pichia*.

13. (original) Process according to claim 12, characterized in that the process is carried out in a host organism selected from the group of *Escherichia coli*, *Bacillus*, *Corynebacterium glutamicum*, *Aspergillus niger* or *Pichia pastoris* host organisms.
14. (currently amended) Process according to claim 12 or 13, characterized in that in the host organism an α,β-enoate reductase gene encoding an enzyme having α,β-enoate reductase activity towards molecules containing an α,β-enoate group and a primary amino group is cloned and expressed.
15. (original) An *Escherichia coli* host cell wherein the α,β-enoate reductase gene from *Ochrobactrum anthropi* NCIMB41200, or from *Acremonium strictum* CBS114157 is cloned and expressed.
16. (original) A *Bacillus* host cell wherein the α,β-enoate reductase gene from *Moorella thermoacetica* DSM1974, or from *Clostridium tyrobutyricum* DSM1460, or from *Ochrobactrum anthropi* NCIMB41200, or from *Acremonium strictum* CBS114157 is cloned and expressed.
17. (original) A *Corynebacterium glutamicum* host cell wherein the α,β-enoate reductase gene from *Moorella thermoacetica* DSM1974, or from *Clostridium tyrobutyricum* DSM1460, or from *Ochrobactrum anthropi* NCIMB41200, or from *Acremonium strictum* CBS114157 is cloned and expressed.
18. (original) An *Aspergillus niger* host cell wherein the α,β-enoate reductase gene from *Acremonium strictum* CBS114157, or from *Moorella thermoacetica* DSM1974, or from *Clostridium tyrobutyricum* DSM1460, or from *Ochrobactrum anthropi* NCIMB41200 is cloned and expressed.
19. (original) A *Pichia pastoris* host cell wherein the α,β-enoate reductase gene from *Acremonium strictum* CBS114157, or from *Moorella thermoacetica*

DSM1974, or from *Clostridium tyrobutyricum* DSM1460, or from *Ochrobactrum anthropi* NCIMB41200 is cloned and expressed.

20. (original) A host cell selected from the group of *Aspergillus*, *Bacillus*, *Corynebacterium*, and *Pichia* host cells, in which the aerostable α,β -enoate reductase gene *nemA* from *E. coli* K12 is cloned and expressed.
21. (original) Process for precursor fermentation of 6-amino caproic acid starting either from 6-aminohex-2-enoic acid (6-AHEA) or from 6-amino-2-hydroxyhexanoic acid (6-AHHA), and applying at least an enzymatic step with an enzyme having α,β -enoate reductase activity towards molecules containing an α,β -enoate group and a primary amino group, in particular with an enzyme having α,β -enoate reductase activity towards 6-aminohex-2-enoic acid.
22. (original) Process according to claim 21, characterized in that the process is performed in a microorganism wherein 6-aminohex-2-enoic acid is being formed *in vivo*.
23. (original) Process according to claim 22, characterized in that 6-aminohex-2-enoic acid is being formed *in vivo* from solutions or slurries containing a suitable carbon source.
24. (original) Biochemically produced 6-aminohex-2-enoic acid, having a ^{12}C versus ^{13}C versus ^{14}C isotope ratio of about the same value as occurring in environmental carbon dioxide.
25. (original) Biochemically produced 6-amino-hexanoic acid having a ^{12}C versus ^{13}C versus ^{14}C isotope ratio of about the same value as occurring in environmental carbon dioxide.
26. (original) ϵ -Caprolactam produced from biochemically produced 6-aminohex-2-enoic acid or 6-amino-hexanoic acid, and having a ^{12}C versus ^{13}C

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versus ^{14}C isotope ratio of about the same value as occurring in environmental carbon dioxide.

27. (original) Nylon-6 and other derivatives produced from any of the biochemically produced products of claims 24 or 25, or from ϵ -caprolactam according to claim 26, and having a ^{12}C versus ^{13}C versus ^{14}C isotope ratio of about the same value as occurring in environmental carbon dioxide.